Reply to Referee#2

Dear Referee#2,

We thank you for taking the time to review our manuscript and for your valuable comments/suggestions. We will carefully revise our manuscript according to your suggestions. Please find our detailed responses below:

MAJOR COMMENTS
FIRST, the contribution of n-alkanes from microbial sources to fluvial and paleosol deposits: Throughout the manuscript the authors make a careful distinction between petrogenic n-alkanes that derive from organic-rich sedimentary rocks (14C dead, Jurassic black shales, in this study) and other n-alkanes from fluvial and paleosol sediments. The latter group are referred to as "leaf wax n-alkanes". While it is true that a major (and perhaps the largest) fraction in this group comprises leaf wax derived structures, it is quite likely that the group also contains microbial derived n-alkanes generated during pedogenic processes. Both molecular and isotopic composition of the "leaf wax" group can potentially be affected by the microbial source, e.g. Li et al. (2018, Org. Geochem. v. 115, 24-31), Wu et al. (2019, Org. Geochem., v. 128, 1-15). The authors, however, never mention this potential microbial source of n-alkanes. I suggest adding a discussion as to why this source is not considered to be important in general, and particularly when correcting F14C results for mass-dependent fractionation using 13C isotopes and when interpreting the results in section '3.5 Implications for leaf wax n-alkane-based paleoenvironmental reconstructions from our FSPS'.

- ➔ Indeed, we missed to state in our manuscript that n-alkanes can also originate from microbial sources or microbial utilization, and thus can produce much younger ^{14}C ages. Especially the potential buildup of long-chain n-alkanes by such organisms as described by Li et al. (2018) can be a serious issue that might complicate ^{14}C dating and the paleoenvironmental interpretation of the respective leaf wax proxies. Therefore, we will include such a statement into the introduction as well as a more detailed discussion into the discussion part as suggested by the reviewer. However, although we cannot completely rule out the influence of microbial utilization, we suggest that non-leaf wax-derived n-alkane contributions in our fluvial sequence are mostly of petrogenic origin. This is based on the fact that short- and mid-chain n-alkanes do not show an odd-over-even predominance, but in case of a dominance of microbial processes we would expect an odd-over-even predominance in these chain lengths.

SECOND, the level of detail when describing the study site The amount of detail given on pp. 3-4 when discussing the study site (section 2.1 Studied Site) and its geomorphological features is too excessive for the purposes of this manuscript. I suggest reducing it to a short paragraph and perhaps combining it with section 2.2 Stratigraphy.

- ➔ In this case, we do not agree with the reviewer, since we feel that our manuscript should be able to stand alone, i.e. without the need to read our formerly published results. Therefore, to allow the readers to easily evaluate the geomorphic situation of the study site we suggest to keep the description as it is.

MINOR COMMENTS
p. 1, line 33: "in-situ produced leaf wax n-alkanes" The use of the word in-situ is somewhat confusing here. Leaf wax n-alkanes can hardly be called in-situ when referring to soils and/or sediments. The term would probably fit more those n-alkanes that were produced within the soil (see above) during pedogenic processes.

- ➔ We will change the term in-situ to on-site.

p. 7, line 8: "All obtained 14C-ages are found in Table 1." Instead of this one-liner, it would be useful to have a short paragraph reminding the reader about the main goals of this paper and how the results obtained here can help with achieving these goals.

- ➔ Will be done